THE HANFORD SITE

KW Groundwater Remediation Brief History and Soil Flushing Treatability Testing

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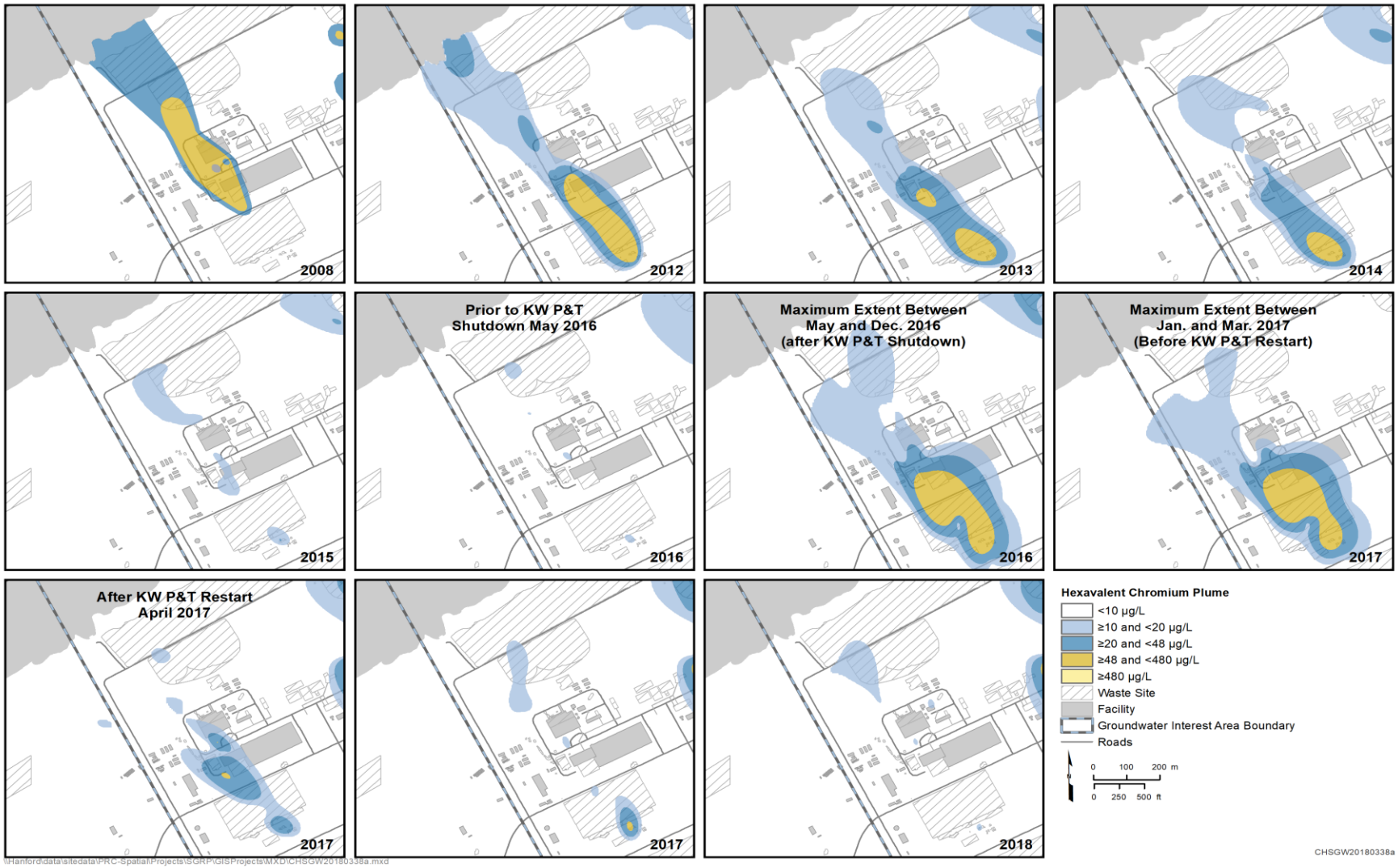
Presented to: Hanford Advisory Board River and Plateau Committee

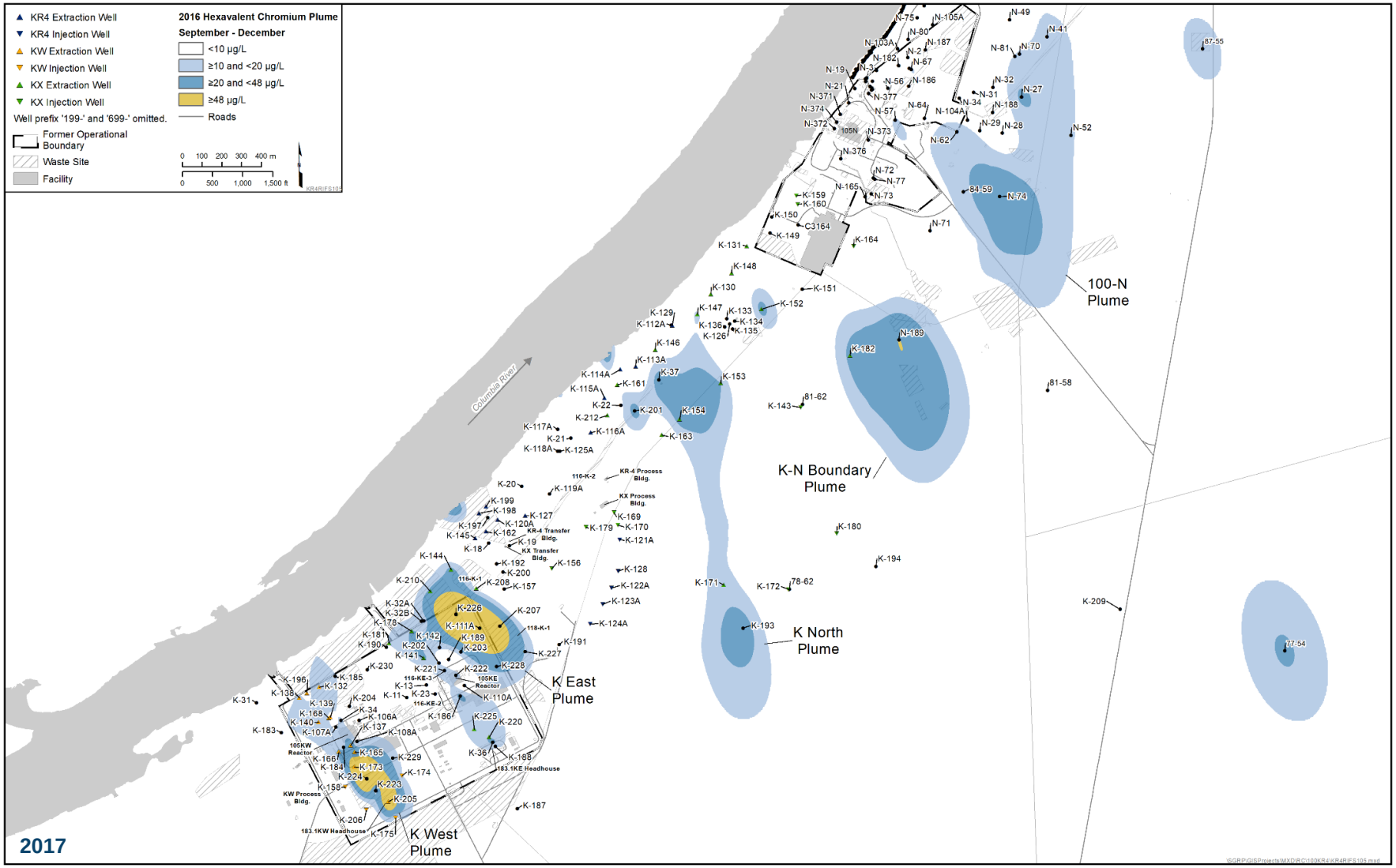
Soil Treatability Test for Chromium Removal

- In 2018, a soil flushing treatability test plan was approved (DOE/RL-2017-30, *KW Soil Flushing/Infiltration Treatability Test Plan)*
- Currently, DOE is testing effectiveness of technology to remove a remaining area of hexavalent chromium [Cr(VI)] contamination in the 100 K Area near the river
- Test includes saturating about 1-acre of soil with treated water
- Goal is to move the chromium to groundwater where existing wells will remove it for treatment, accelerating the cleanup process

Hexavalent Chromium Groundwater Plumes (2008 through 2018)



100 K Area


KR4 Extraction Well
KR4 Injection Well
KW Extraction Well
KW Injection Well
KX Extraction Well
KX Injection Well
Well prefix '199-' and '699-' omitted.
Former Operational Boundary
Waste Site
Facility
2016 Hexavalent Chromium Plume
September - December
<10 µg/L
≥10 and <20 µg/L
≥20 and <48 µg/L
≥48 µg/L
Roads
0 100 200 300 400 m
0 500 1,000 1,500 ft
Columbia River
100-N Plume
K-N Boundary Plume
K North Plume
K East Plume
K West Plume
2017

Treatability Test Schedule

- **February 6, 2019**: Completed disconnect of KW pump and treat (P&T) extraction well 199-K-205
- **April 1, 2019**: Completed installation of leach field laterals and performed initial test of the field
- **May 28, 2019**: Completed operations acceptance testing and official start of soil flushing treatability test
  - Phase 1 of the treatability test included putting about 8.6 million gallons of water through the soil column, estimated to take about 23 days at 265 gallons per minute to saturate the vadose zone
  - Within 2 days, saw response at upgradient monitoring well and 30 days to saturate vadose zone
- **September 2019**: Draft Effectiveness Assessment and Recommendation Report
- **September through November**: Phase 2, continue flushing with additional 8.6 million gallons
- **February 2020**: Final report on effectiveness assessment and recommendation

Digging of Trenches and Installation of Distribution Pipes

Construction of Infiltration Gallery

Components of the Leach Field

Distribution Pipes and Coverings

Valve Box Separating Quadrants

Distribution Lateral Over Encountered Obstruction

Injection Well and Leach Field Manifold

Pressure Test of Laterals

Pressure Test of Laterals with Raw Water

Covering of Laterals

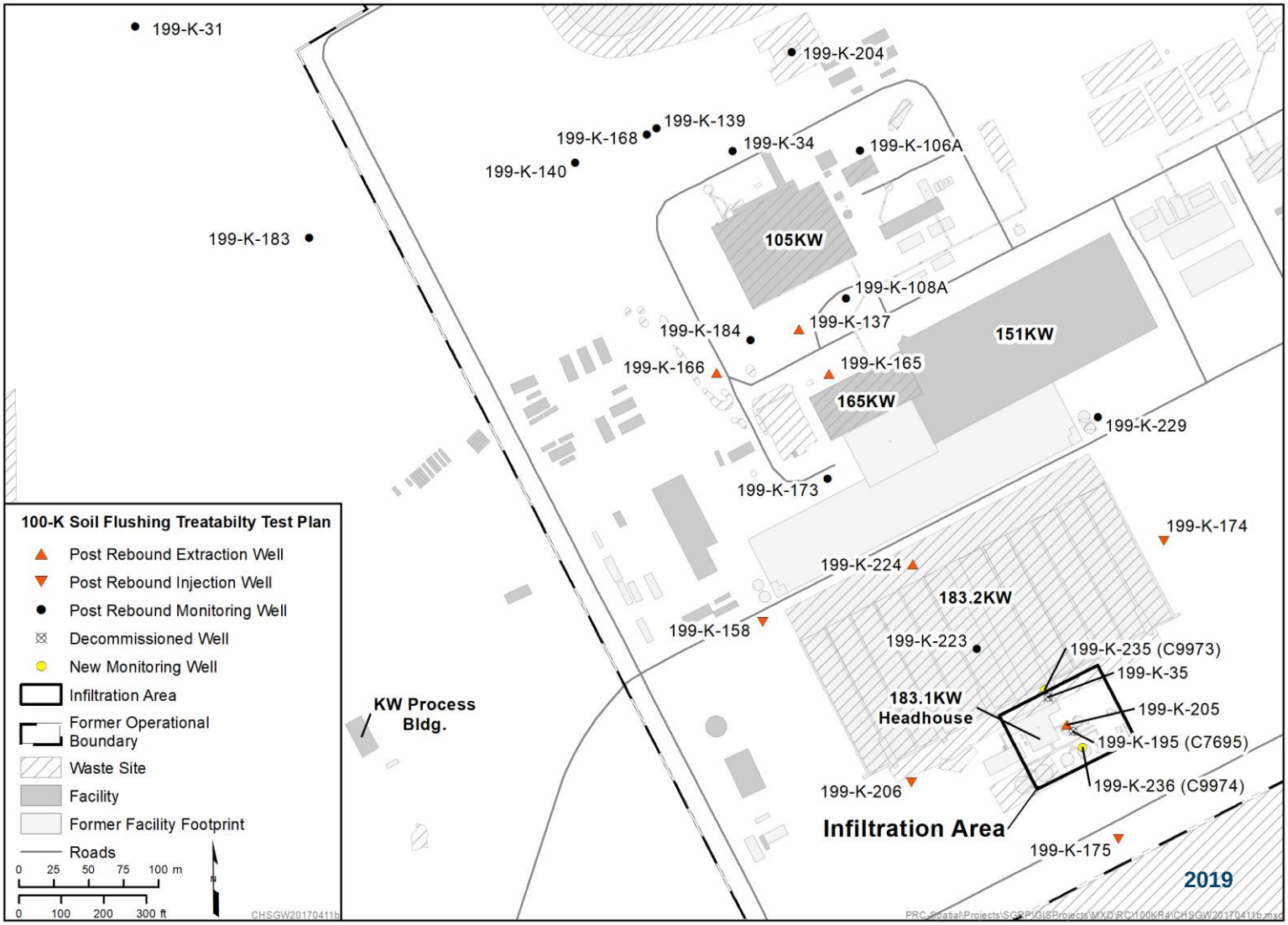
Distribution Pipes Hanging in Covering

Covered Distribution Lateral

Covering Pipe Over Obstruction

Current Condition

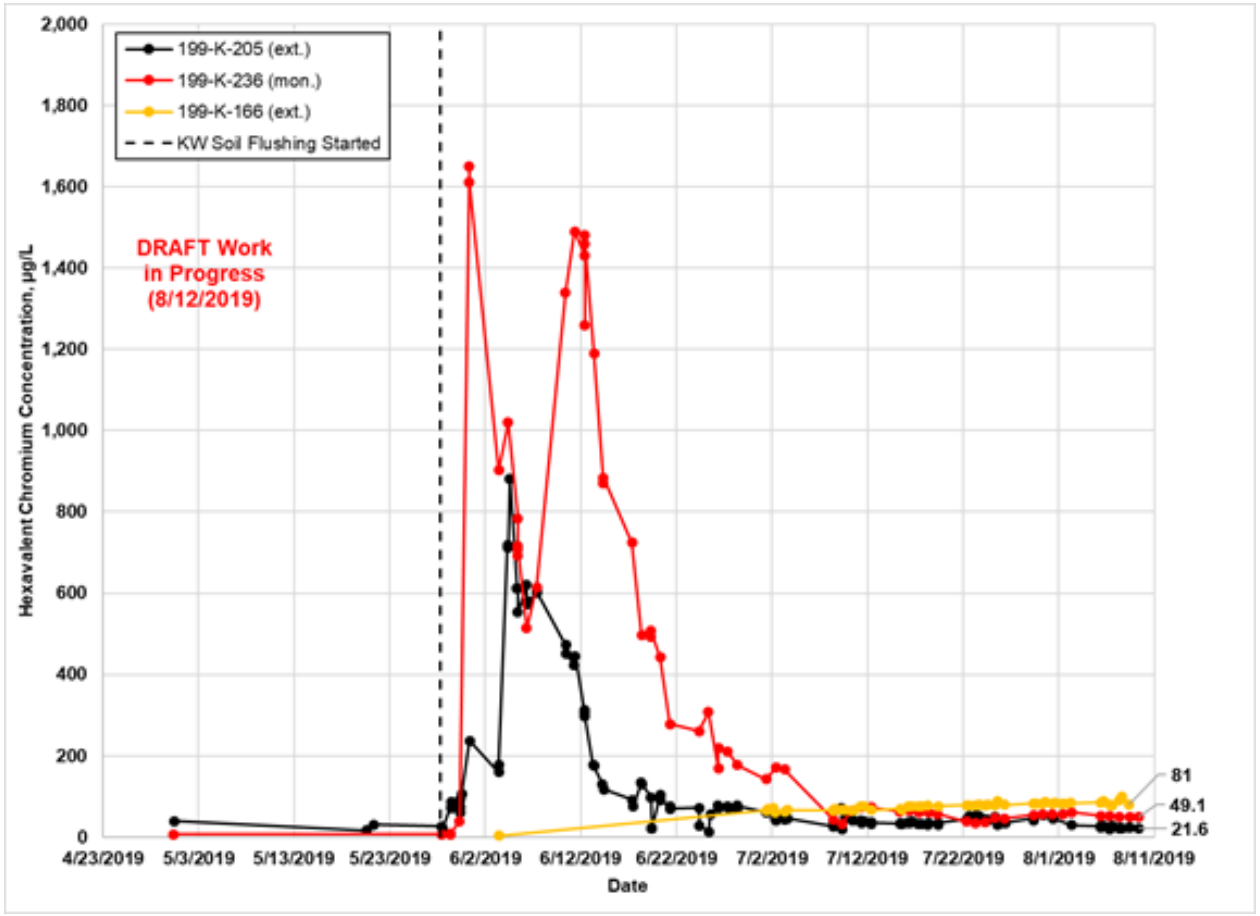
KW Soil Flushing Monitoring Wells



KW Soil Flushing Treatability Test Status

- As of August 12, 2019, approximately 26.7 million gallons of KW P&T effluent have been discharged to the ground via the leach field
- KW extraction wells 199-K-166 and 199-K-205 and monitoring well 199-K-236 have exhibited increases of Cr(VI) concentration during the test
- Other monitoring well locations have experienced increases of Cr(VI) to 23.7 micrograms per liter (µg/L), but have dropped and remained below 15 µg/L

Cr(VI) Concentrations Observed During Treatability Test



The maximum observed Cr(VI) concentration was 1,650 µg/L at monitoring well 199-K-236

The maximum observed Cr(VI) concentration at KW extraction well WE11 (199-K-205) was 882 µg/L

Key Takeaways

- Soil flushing is effective at removing residual Cr(VI) from the vadose zone.
- After removal of waste sites and demolition of remaining facilities, this treatment can be implemented efficiently, quickly, and at a relatively low cost.
- This technology is only implemented in areas where there is adequate hydraulic capture.